Coating and Method for Strengthening a Structure

I claim:

1. A method for increasing the resistance of a structure to explosive forces, comprising the steps of:

applying a first layer of a fluid precursor to an elastomeric solid to the structure;

affixing textile over the applied first fluid layer;

applying a second layer of a fluid precursor to an elastomeric solid over the affixed textile such that the affixed textile is covered by fluid precursor and fluid precursor fills the open spaces of the affixed textile; and

allowing curing of the fluid precursors into elastomeric solids.

2. The method of claim 1, wherein the step of applying a first layer of a fluid precursor to an elastomeric solid to the structure includes the steps of:

providing two components that, when mixed, react to form a cross-linked elastomeric solid; and

spraying the components from a mixing spray gun such that a stoichiometric mixture of the two components is deposited on the structure.

3. The method of claim 1, wherein the step of applying a second layer of a fluid precursor to an elastomeric solid over the affixed textile includes the steps of:

providing two components that, when mixed, react to form a cross-linked elastomeric solid; and

spraying the components from a mixing spray gun such that a stoichiometric mixture of the two components is deposited on the affixed textile.

4. The method of claim 1, wherein the step of affixing the textile over the first fluid layer includes the steps of:

providing a piece of textile; and

pressing the textile against the fluid layer such that the tackiness of the fluid precursor holds the textile in place during the time required to complete applying fluid precursor and for the precursor to cure.

5. The method of claim 1, wherein the steps of affixing the textile over the first fluid layer and applying a second layer of a fluid precursor such that the textile is covered by fluid and fluid fills the open spaces of the textile are repeated so as to create a coating comprising three layers of elastomeric solid and two layers of textile.

6. The method of claim 2, wherein the fluid precursor to an elastomeric solid cures upon mixing of the two components, at room temperature, to form a polyurethane elastomer.

7. The method of claim 3, wherein the fluid precursor to an elastomeric solid cures upon mixing of the two components, at room temperature, to form a polyurethane elastomer.

8. The method of claim 1, wherein the textile is composed of fiber selected from the group consisting of glass, carbon, polyaramid, polyimide, polyester, or nylon.

9. The method of claim 2, wherein the first layer of fluid precursor to an elastomeric solid cures to form an elastomer from the group consisting of silicone, epoxy, polyurethane, neoprene, natural rubber, polyurea, or butyl rubber.

10. The method of claim 3, wherein the second layer of fluid precursor to an elastomeric solid cures to form an elastomer from the group consisting of silicone, epoxy, polyurethane, neoprene, natural rubber, polyurea, or butyl rubber.

11. The method of claim 1, the structure further including an interior corner, and the step of affixing the textile over the first fluid layer further including the step of:

reinforcing an interior corner in the structure by affixing textile such that opposite edges of a single piece of textile are attached to surfaces on opposite sides of the corner and the middle section of the textile covers the corner.

12. A composite coating for increasing the resistance to explosive forces of a structure, comprising:

a first layer elastomer in contact with and adhering to the structure;

a second layer elastomer in contact with and adhering to said first layer; and

textile embedded between said first and second layers.

13. The coating of claim 12, wherein said textile is a cloth containing yarns of glass, carbon, polyaramid, polyimide, polyester, or nylon.

14. The coating of claim 13, wherein said yarns are woven with adjacent parallel yarns spaced apart one-sixteenth of an inch to one inch.

15. The coating of claim 12, wherein said first and second layers of elastomer were applied to the structure by depositing fluid precursor compositions that cure in ambient conditions to form an elastomer of the group consisting of silicone, epoxy, polyurethane, neoprene, natural rubber, polyurea, or butyl rubber.

16. The coating of claim 15, wherein said textile was embedded between said first and second layers of elastomer by affixing said textile to applied said first layer fluid precursor before said second layer precursor was applied.

17. The coating of claim 16, wherein the tackiness of applied said first layer precursor affixed said textile to said first layer.

18. The coating of claim 12, said second layer further including means for rendering said coating fire-resistant.

19. In combination:

a structure; and

a composite coating adhering to said structure for increasing the resistance to explosion forces of the structure; comprising:

a first layer elastomer in contact with and adhering to said structure;

a second layer elastomer in contact with and adhering to said first layer; and

textile embedded between said first and second layers.

20. The combination of claim 19, wherein said first layer elastomer is attached to said structure by applying to said structure a fluid precursor that cures under ambient conditions to become an elastomer.

21. The combination of claim 20, wherein said fluid precursor is a two-component formulation that reacts upon mixing to become polyurethane elastomer.

22. The combination of claim 21, wherein said two-component formulation is applied to said structure by spraying.

23. The combination of claim 19, said textile comprising a fabric including yarns of glass, carbon, polyaramid, or polyimide.

24. The combination of claim 23, wherein said yarns are woven with adjacent parallel yarns spaced apart one-sixteenth of an inch to one inch.

25. The combination of claim 19, said second layer further including menas for rendering said coating fire-resistant.